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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/723,054	11/25/2003	Carol Jeffcoate	H0003768	7777

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EXAMINER	
CHUO, TONY SHENG HSIANG	

ART UNIT	PAPER NUMBER
1795	

NOTIFICATION DATE	DELIVERY MODE
08/26/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/723,054	JEFFCOATE, CAROL	
	Examiner	Art Unit	
	Tony Chuo	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 July 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *12-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *12-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Claims 12-28 are currently pending. Claims 1-11 are cancelled. The previously stated 112, 2nd paragraph rejection of claims 27 and 28 is withdrawn. The amended claims do not overcome the previously stated 102 and 103 rejections. Therefore, upon further consideration, claims 12-28 stand rejected under the following 102 and 103 rejections.

Claim Rejections - 35 USC § 102/103

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 12, 16, 17, 27, and 28 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Farkash et al (US 2001/0036568) and as evidenced by Houlberg (US 2004/0137295).

Regarding claims 12, 27, and 28, the Farkash reference discloses a method of controlling a temperature of a fuel cell system, the method comprising: detecting a temperature of plate "208" (measuring the operating temperature of fuel cell assembly adjacent to the thermoelectric layer at one or more locations across the fuel cell assembly); and in response to the detected temperature, controlling a power source to provide power to resistive temperature device "254" (thermoelectric device) as needed to maintain the plate "208" at a predetermined temperature, thereby heating end plate "226" (See paragraph [0095]). It also discloses regulating the supply of electrical power to heating elements to maintain end plate at the operating temperature of the fuel cell stack (See paragraph [0086]). It also discloses that the heatable ends help to maintain the temperature of the fuel cell stack at a desired temperature and uniform along the length of the stack (See paragraph [0031]). It also discloses controlling the heating of the end plates according to a predetermined operation such as a feedback loop which implies that fuel cell assembly is heated and cooled until the desired temperature is stabilized (See paragraph [0097]).

Examiner's note: The thermoelectric layer disclosed by Farkash is in contact with the fuel cell assembly so the thermoelectric layer necessarily heats or cools the fuel cell assembly. In addition, it is inherent that controlling a power source to provide power to resistive temperature device comprises adjusting a voltage of a power source to the resistive temperature device to heat or cool the fuel cell assembly in contact with the thermoelectric layer. As evidenced by Houlberg, resistive heatable element, adapted to heat the end cell of the fuel cell stack (power source), connected in parallel to the fuel

cell stack, whereby the heat output of the resistive heatable element increases as the voltage of the fuel cell stack increases and decreases as the voltage of the fuel cell stack decreases, thereby heating the end cell when the heat output increases and cooling the end cell when the heat output decreases (See paragraph [0039] and claim 16).

Regarding claim 16, it also discloses a fuel cell assembly that is a proton exchange membrane fuel cell (see paragraph [0072]).

Regarding claim 17, it also discloses contacting a periphery of the fuel cell with an end plate "226" that is construed as a heat sink (See paragraph [0095]).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Farkash et al (US 2001/0036568) in view of Kaneko (JP 06-318736). The Farkash reference is applied to claim 12 for reasons stated above.

However, Farkash et al does not expressly teach thermoelectric devices that are Peltier devices. The Kaneko reference teaches a method of controlling the temperature of a substrate by using a thin film Peltier thermoelectric element (See paragraph [0013]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Farkash method of controlling a temperature of a fuel cell stack to include thermoelectric devices that are Peltier devices in order to utilize a thermoelectric device that allows for the temperature control of a bigger heating value. In addition, the substitution of one known thermoelectric device for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

7. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Farkash et al (US 2001/0036568) in view of Keegan (US 2003/0003339). The Farkash reference is applied to claim 12 for reasons stated above.

However, Farkash et al does not expressly teach a power source that is a battery. The Keegan reference discloses a power source that provides power to heat fuel cell interconnects comprising a battery (See paragraph [0028],[0029]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Farkash method of controlling the temperature of the fuel cell stack to include a power source that is a battery in order to utilize a suitable power source that is typically external to the fuel cell assembly and used in combination with the fuel cell assembly. In addition, the substitution of one known power source for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

8. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Farkash et al (US 2001/0036568) in view of Houlberg (US 2004/0137295). The Farkash reference is applied to claim 12 for reasons stated above.

However, Farkash et al does not expressly teach a power source that is the fuel cell assembly. The Houlberg reference discloses resistive heatable elements (thermoelectric element) that is electrically connected to the fuel cell stack (See paragraph [0039]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Farkash method of controlling the temperature of the fuel cell stack to include a power source that is the fuel cell assembly in order to more efficiently utilize the power generated by the fuel cell stack to maintain the fuel cell at a uniform temperature. In addition, the substitution of one known power source for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

9. Claims 18, 19, 21, and 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farkash et al (US 2001/0036568) in view of Enjoji et al (US 2004/0101728).

The Farkash reference discloses a method of controlling a temperature of a fuel cell system, the method comprising: providing an end plate in thermal contact with a periphery of the fuel cell stack; detecting a temperature of plate "208" (measuring the operating temperature of fuel cell assembly adjacent to the thermoelectric layer at one or more locations across the fuel cell assembly); and in response to the detected

temperature, a controller that controls the power source to provide power to resistive temperature device "254" (thermoelectric device) as needed to maintain the plate "208" at a predetermined temperature, thereby heating end plate "226" (See paragraph [0095]). It also discloses regulating the supply of electrical power to heating elements to maintain end plate at the operating temperature of the fuel cell stack (See paragraph [0086]). It also discloses that the heatable ends helps to maintain the temperature of the fuel cell stack at a desired temperature and uniform along the length of the stack (See paragraph [0031]). It also discloses a temperature sensor assembly including a sensor that is a thermocouple (See paragraph [0094]). It also discloses a fuel cell assembly that is a proton exchange membrane fuel cell (see paragraph [0072]).

Examiner's note: The thermoelectric layer disclosed by Farkash is in contact with the fuel cell assembly so the thermoelectric layer necessarily heats or cools the fuel cell assembly. In addition, it is inherent that controlling a power source to provide power to resistive temperature device comprises adjusting a voltage of a power source to the resistive temperature device to heat or cool the fuel cell assembly in contact with the thermoelectric layer.

However, Farkash et al does not expressly teach a step of providing one or more thermoelectric layers in between adjacent fuel cell assemblies in the fuel cell stack; or a step of measuring the start-up temperature of the fuel cell assembly in contact with a thermoelectric layer. The Enjoji reference discloses the steps of providing a heating mechanism "84b" between adjacent fuel cells "82m" and "82m-1" and measuring the

temperature of the fuel cell during warm up which is the start-up temperature of the fuel cell (See paragraph [0064] and Figure 8).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Farkash method of controlling the temperature of the fuel cell stack to include a step of providing one or more thermoelectric layers in between adjacent fuel cell assemblies in the fuel cell stack; and a step of measuring the start-up temperature of the fuel cell assembly in contact with a thermoelectric layer in order to provide a method of warming up the fuel cell stack in which the fuel cell stack can be warmed up reliably in a short period of time with a simple process (See paragraph [0010]).

10. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Farkash et al (US 2001/0036568) in view of Enjoji et al (US 2004/0101728) as applied to claim 18 above, and further in view of Kaneko (JP 06-318736).

However, Farkash et al as modified by Enjoji et al does not expressly teach thermoelectric devices that are Peltier devices. The Kaneko reference teaches a method of controlling the temperature of a substrate by using a thin film Peltier thermoelectric element (See paragraph [0013]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Farkash/Enjoji method of controlling a temperature of a fuel cell stack to include thermoelectric devices that are Peltier devices in order to utilize a thermoelectric device that allows for the temperature control of a bigger heating value. In addition, the substitution of one known thermoelectric device

for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

11. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Farkash et al (US 2001/0036568) in view of Enjoji et al (US 2004/0101728) as applied to claim 18 above, and further in view of Keegan (US 2003/0003339).

However, Farkash et al as modified by Enjoji et al does not expressly teach a power source that is a battery. The Keegan reference discloses a power source that provides power to heat fuel cell interconnects comprising a battery (See paragraph [0028],[0029]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Farkash/Enjoji method of controlling the temperature of the fuel cell stack to include a power source that is a battery in order to utilize a suitable power source that is typically external to the fuel cell assembly and used in combination with the fuel cell assembly. In addition, the substitution of one known power source for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

12. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Farkash et al (US 2001/0036568) in view of Enjoji et al (US 2004/0101728) as applied to claim 18 above, and further in view of Houlberg (US 2004/0137295).

However, Farkash et al as modified by Enjoji et al does not expressly teach a power source that is the fuel cell. The Houlberg reference discloses resistive heatable

elements (thermoelectric element) that is electrically connected to the fuel cell stack (See paragraph [0039]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Farkash/Enjoji method of controlling the temperature of the fuel cell stack to include a power source that is the fuel cell in order to more efficiently utilize the power generated by the fuel cell stack to maintain the fuel cell at a uniform temperature. In addition, the substitution of one known power source for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

Response to Arguments

13. Applicant's arguments filed 7/6/10 have been fully considered but they are not persuasive.

The applicant argues that at most, Farkash discloses that a voltage applied to its resistive temperature device can actively heat a collector plate, while reducing a voltage passively cools the collector plate. Such a device does not actively remove heat from a fuel cell assembly.

In response, this argument is not commensurate with the scope of the claims. Claims 12 and 18 only require a thermoelectric layer that heats or cools the fuel cell assembly. There is no recitation in the claims of a thermoelectric layer that actively removes heat from the fuel cell assembly.

The applicant further argues that Farkash fails to disclose adjusting a voltage of a power source in response to the measured temperature to heat or cool the fuel cell assembly or the heat distribution of the fuel cell assembly that is substantially uniform.

In response, the examiner maintains the contention that it is inherent that Farkash's disclosure of controlling a power source to provide power to resistive temperature device comprises adjusting a voltage of a power source to the resistive temperature device to heat or cool the fuel cell assembly in contact with the thermoelectric layer. In addition, Houlberg provides evidence of a heat output of the resistive heatable element that increases as the voltage increases and decreases as the voltage decreases, thereby heating the end cell when the heat output increases and cooling the end cell when the heat output decreases. Further, the examiner maintains the contention that a fuel cell assembly that has uniform temperature also has a heat distribution that is substantially uniform. For example, a fuel cell end plate that is maintained at the operating temperature of the fuel cell stack inherently has a uniform heat distribution because the amount of heat applied to the end plate is constant.

The applicant further argues that Enjoji fails to disclose or suggest adjusting a voltage of power source in response to the measured temperature to heat or cool at least one fuel assembly; or that the heat distribution of a fuel cell is substantially uniform.

In response, the Enjoji reference is relied upon for teaching the concept of providing a heating mechanism “84b” between adjacent fuel cells "82m" and “82m-1”. Therefore, the examiner maintains that Farkash already discloses adjusting a voltage of

power source in response to the measured temperature to heat or cool at least one fuel assembly and a heat distribution of a fuel cell is substantially uniform.

The applicant further argues that Kaneko fails to disclose or suggest measuring the operating temperature of a fuel cell assembly in contact with a thermoelectric layer; adjusting a voltage of power source in response to the measured temperature to heat or cool the fuel assembly; or that the heat distribution of a fuel cell is substantially uniform.

In response, the Kaneko reference is relied upon for teaching a method of controlling the temperature of a substrate by using a thin film Peltier thermoelectric element. As stated above, Farkash already discloses measuring the operating temperature of a fuel cell assembly in contact with a thermoelectric layer; adjusting a voltage of power source in response to the measured temperature to heat or cool the fuel assembly; and the heat distribution of a fuel cell that is substantially uniform.

The applicant further argues that Keegan fails to disclose or suggest measuring the operating temperature of a fuel cell assembly in contact with a thermoelectric layer; adjusting a voltage of power source in response to the measured temperature to heat or cool the fuel assembly; or that the heat distribution of a fuel cell is substantially uniform.

In response, the Keegan reference is relied upon for teaching a power source that provides power to heat fuel cell interconnects, wherein the power source is a battery. As stated above, Farkash already discloses measuring the operating temperature of a fuel cell assembly in contact with a thermoelectric layer; adjusting a voltage of power source in response to the measured temperature to heat or cool the fuel assembly; and the heat distribution of a fuel cell that is substantially uniform.

The applicant further argues that Houlberg fails to disclose or suggest measuring the operating temperature of a fuel cell assembly in contact with a thermoelectric layer; adjusting a voltage of power source in response to the measured temperature to heat or cool the fuel assembly; or that the heat distribution of a fuel cell is substantially uniform.

In response, the Houlberg reference is relied upon for teaching resistive heatable elements (thermoelectric element) that is electrically connected to the fuel cell stack. As stated above, Farkash already discloses measuring the operating temperature of a fuel cell assembly in contact with a thermoelectric layer; adjusting a voltage of power source in response to the measured temperature to heat or cool the fuel assembly; and the heat distribution of a fuel cell that is substantially uniform.

The applicant further argues that Enjoji and Kaneko, Enjoji and Keegan, and Enjoji and Houlberg fail to disclose adjusting a voltage of power source in response to the measured temperature to heat or cool the fuel assembly; or that the heat distribution of a fuel cell is substantially uniform.

In response, as stated above, Farkash already discloses adjusting a voltage of power source in response to the measured temperature to heat or cool the fuel assembly; and the heat distribution of a fuel cell that is substantially uniform.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony Chuo whose telephone number is (571)272-0717. The examiner can normally be reached on M-F, 9:00AM to 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer Michener can be reached on (571) 272-1424. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

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TC

/Ula C Ruddock/
Supervisory Patent Examiner, Art Unit 1795